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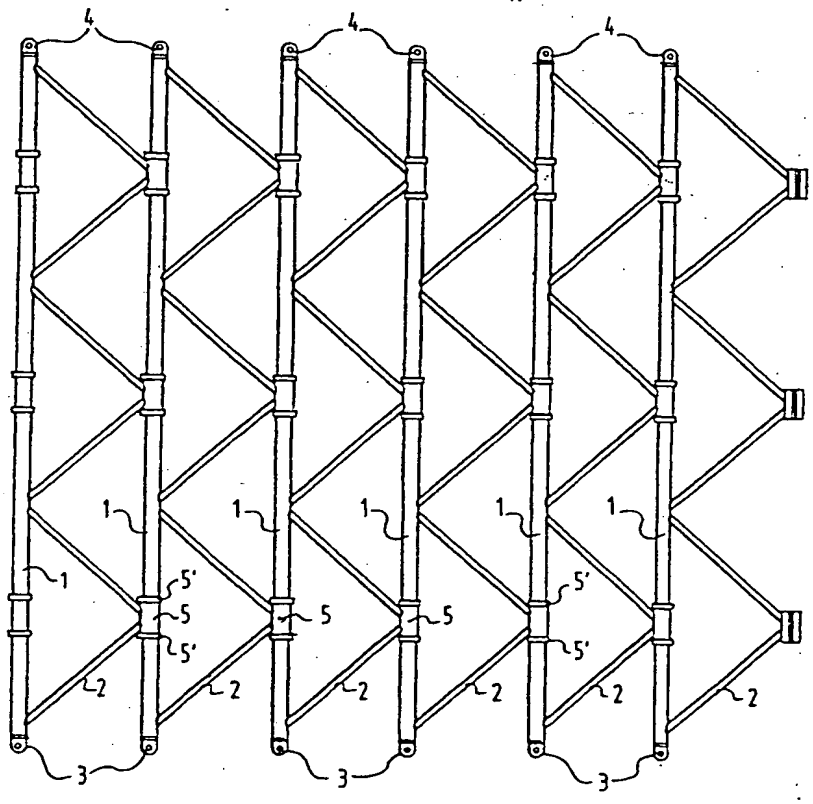
(54) Title: FRAME STRUCTURE FOR ASSEMBLING A BOOM, HOISTING OR BUILDER'S CRANE, A BRIDGE OR THE LIKE

(57) Abstract

Structure for assembling a boom, hoisting or builder's crane, bridge or the like, consisting of at least three frame sections of longitudinal and transverse profiles, for instance tubular profiles, wherein the frame sections are coupled to each other for mutual pivoting by means of a pivot member between the transverse profiles of the one section and the longitudinal profiles of the other section, whereby the cross-section can be made smaller for transport purposes by collapsing the spatial structure.



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FRAME STRUCTURE FOR ASSEMBLING A BOOM, HOISTING OR BUILDER'S CRANE, A BRIDGE OR THE LIKE

The invention relates to a structure for assembling a boom, hoisting or builder's crane, bridge or the like, consisting of at least three frame sections of longitudinal and transverse profiles, for instance tubular profiles.

According to the standard frame technique the booms or hoisting cranes consist of welded frame structures of a fixed cross-section. Where long structural components are concerned, these long booms can be sub-divided in length-direction into shorter pieces which have to be mutually coupled. Although these pieces are transportable, the large cross-section remains a problem, on the one hand one of large volume during transport and on the other one of limiting the cross-section in respect of the permissible height and width of normal road transport, whereby a limitation of the boom strength is determined.

The invention has for its object to obviate the above stated drawbacks and provides for this purpose a frame structure which is distinguished in that the frame sections are coupled to each other for mutual pivoting by means of a pivot member between the transverse profiles of the one section and the longitudinal profiles of the other section.

Owing to the pivot construction between the frame sections it is possible to make the cross-section of a hoisting boom smaller during transport. Not only can the transport volume be hereby reduced to about a quarter or less of the operational cross-section, but the invention also makes it possible to make very many boom cross-sections from basic side sections, depending on the desired boom strength. By forming the cross-section of the boom as a random polygon of for instance triangle to dodecagon or any other random prism, the cross-section can be made larger than the permissible transport cross-section.

The collapsible frame structure is also important when the required transport and construction time is

greater than the hoisting operation time. There is moreover less risk of damage during transport.

The invention is further elucidated in the figure description hereinbelow with reference to a drawing. In the drawing:

fig. 1 shows a top view of a spread structure of side walls for a hexagonal boom part,

fig. 2 shows a front view of the collapsed side walls of the hexagonal boom part of fig. 1,

fig. 3 shows a cross-section of the hexagonal boom part of fig. 1 in the operational situation,

fig. 4 is a front view of the spread frame structure of fig. 1,

fig. 5a-5d show a front view of a triangular boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 6a-c show a front view of a square boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 7 shows a front view of a hexagonal boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 8 shows a front view of an octagonal boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 9 shows a front view of a dodecagonal boom part, respectively in collapsed situation, respectively in spread position in top view,

fig. 10 shows an embodiment of a boom part with a hexagonal cross-section which has greater torsional stiffness than that of fig. 7.

The boom part shown schematically in fig. 1 consists of six practically identical boom side sections, each consisting of a longitudinal profile 1, each of which is provided with an even number of transverse profiles 2. On the end of each longitudinal profile 1 is situated a connecting member 3, 4 so that a number of boom parts can be connected to each other mutually in line so as to obtain a longer structural part.

The frame sections are mutually connected with pivots 5, for which purpose each pivot is embodied as a tubular sleeve which is welded to two transverse profiles 2 at each position where these come together, and which tubular sleeve 5 is rotatable round the adjacent longitudinal profile and is enclosed by flanges 5' so that the tubular sleeve cannot slide along the profile.

Each tubular sleeve 5 can be divided and consist of two half-shells for mutual connection, see on the right in fig. 4, such that assembly of the frame structure is considerably simplified and wherein the number of sections can be increased and the cross-section therefore enlarged, compare fig. 3 to fig. 9.

Inside the assembled spatial structure can be arranged transverse connecting profiles 6 which are connected to the longitudinal profiles 1 and herein cross over one or more other longitudinal profiles 1, thus creating cross-sectionally triangular, statically stable transverse profiles.

Fig. 5 shows a frame structure with three sections which form a triangle in cross-section. Fig. 6 shows four sections which form a square. Fig. 8 shows an octagon consisting of two structural parts 6c, while fig. 9 shows a dodecagonal frame boom consisting of two hexagons as according to fig. 7.

Fig. 10 shows a boom construction with torsional stiffness, wherein the transverse profiles come to lie mutually in line. The longitudinal profiles are mutually shifted half a pitch for this purpose.

The dimensions of the side sections are preferably such that in the collapsed position they fit into a normal container of 6 or 12 metres, whereby particularly transport over water can take place more compactly in safer and simpler manner.

As elucidated above, the invention enables the assembly from a series of standard side sections of a random strong and high boom, hoisting crane or bridge with a cross-section which in the known art cannot be transported by road.

CLAIMS

1. Structure for assembling a boom, hoisting or builder's crane, bridge or the like, consisting of at least three frame sections of longitudinal and transverse profiles, for instance tubular profiles, **characterized in that** the frame sections are coupled to each other for mutual pivoting by means of a pivot member between the transverse profiles of the one section and the longitudinal profiles of the other section.

2. Frame structure as claimed in claim 1, **characterized in that** the pivot member is formed by a tubular sleeve which is fixedly connected to one or two transverse profiles and which is rotatable in non-slidable manner round a longitudinal profile.

3. Frame structure as claimed in claim 1 and/or 2, **characterized in that** each longitudinal profile of a boom part is provided on the end thereof with a connecting means in order to enable mutual connection of the structural parts in longitudinal direction.

4. Frame structure as claimed in any of the foregoing claims, **characterized in that** a transverse connecting profile is arranged between two longitudinal profiles such that the transverse profile crosses over at least one intermediate longitudinal profile to form a triangular, statically stable cross-section.

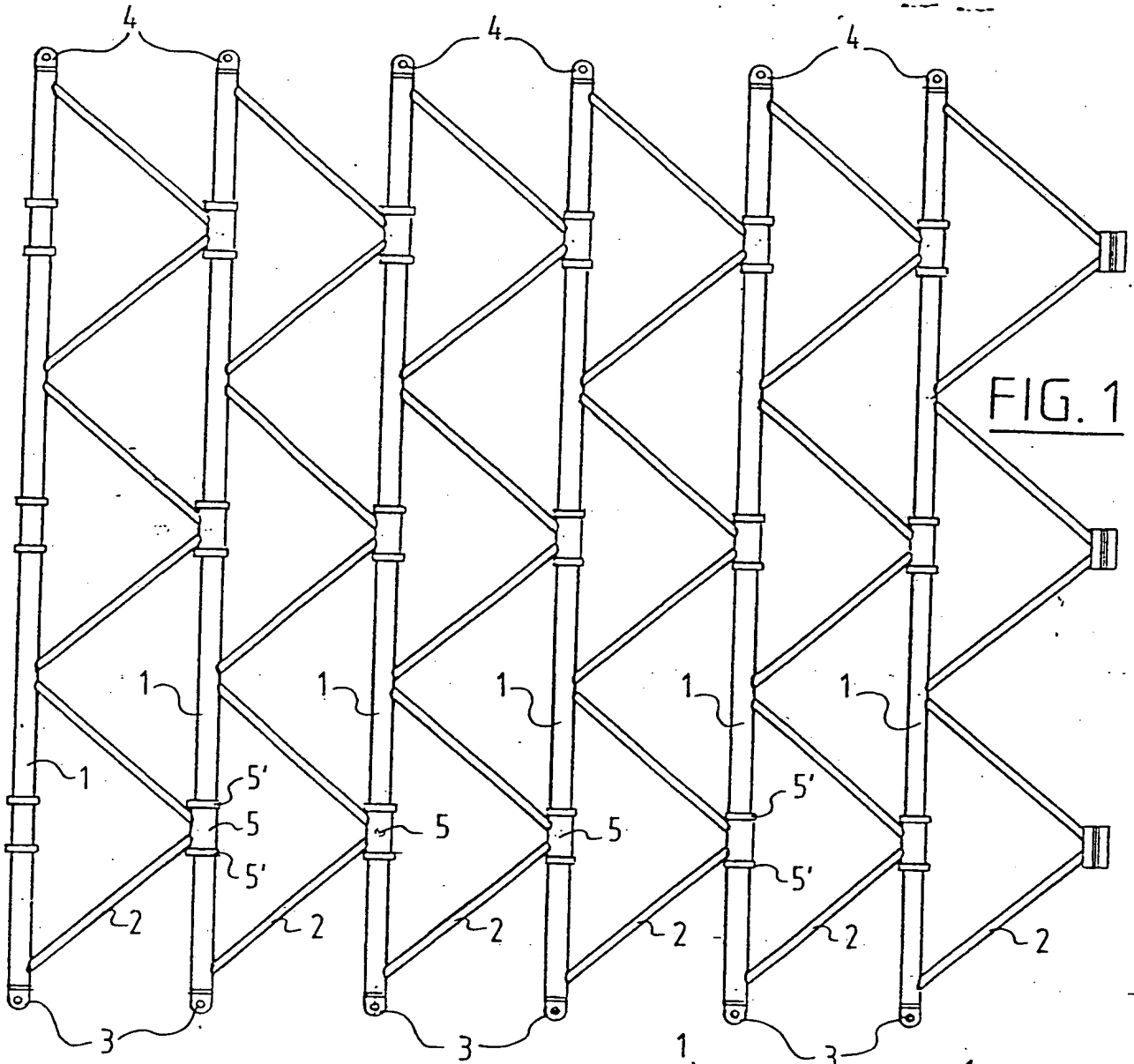


FIG. 1

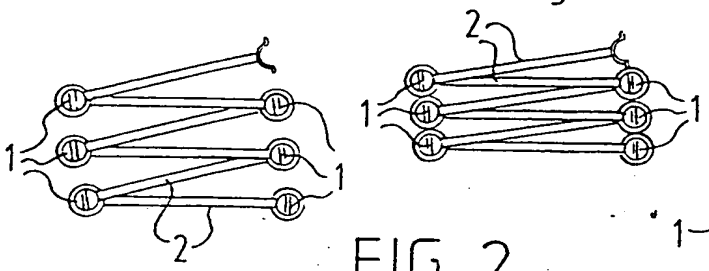


FIG. 2

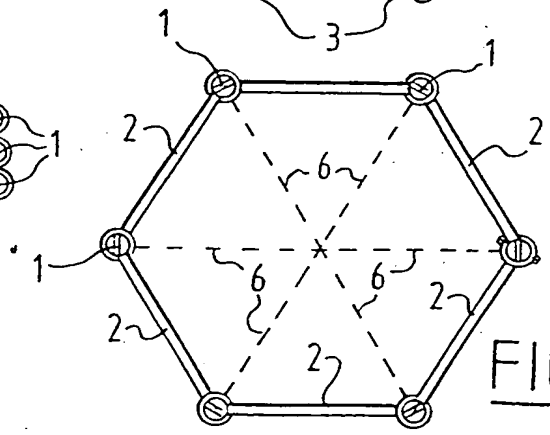


FIG. 3

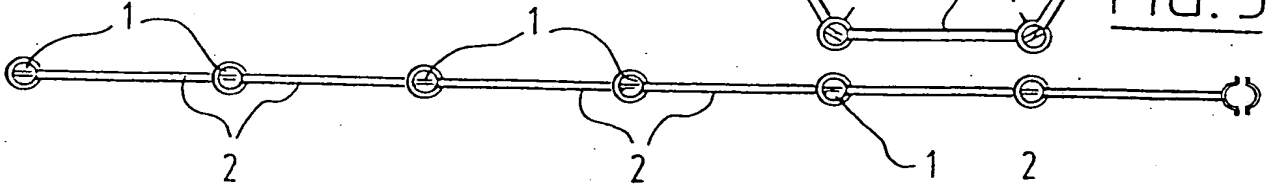
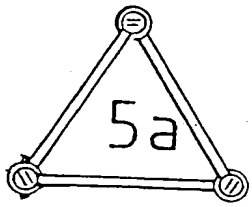
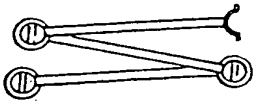


FIG. 4





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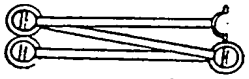

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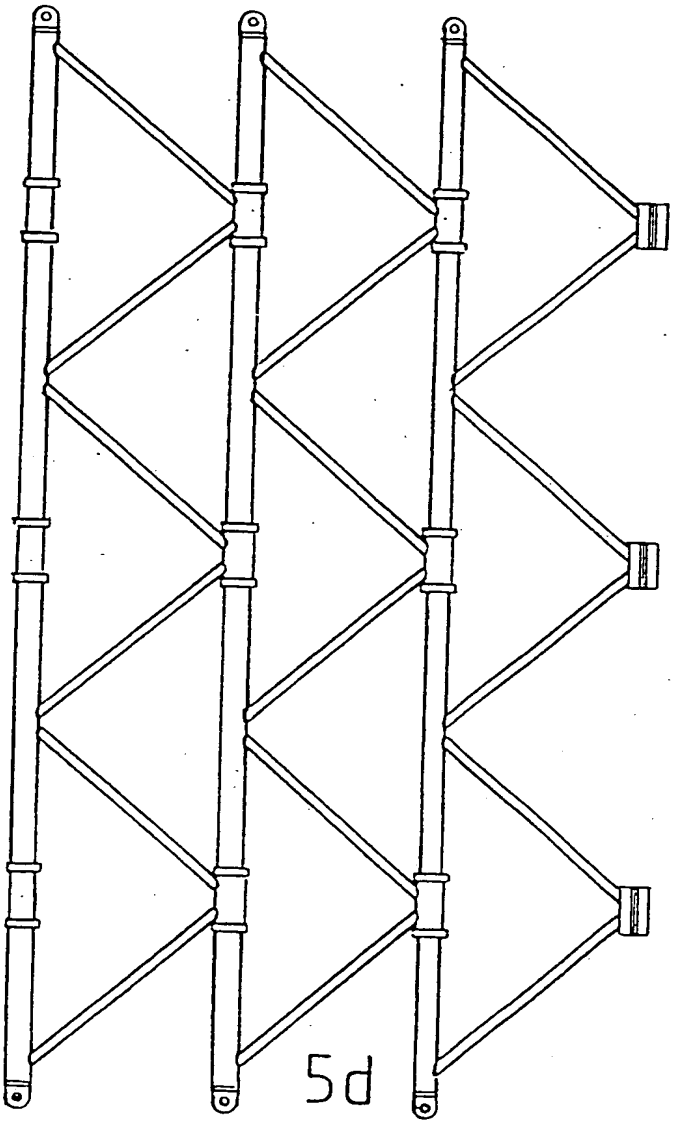
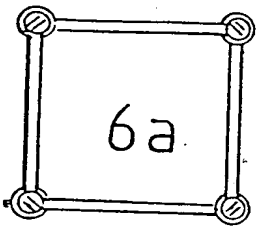
FIG. 5





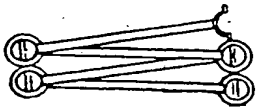


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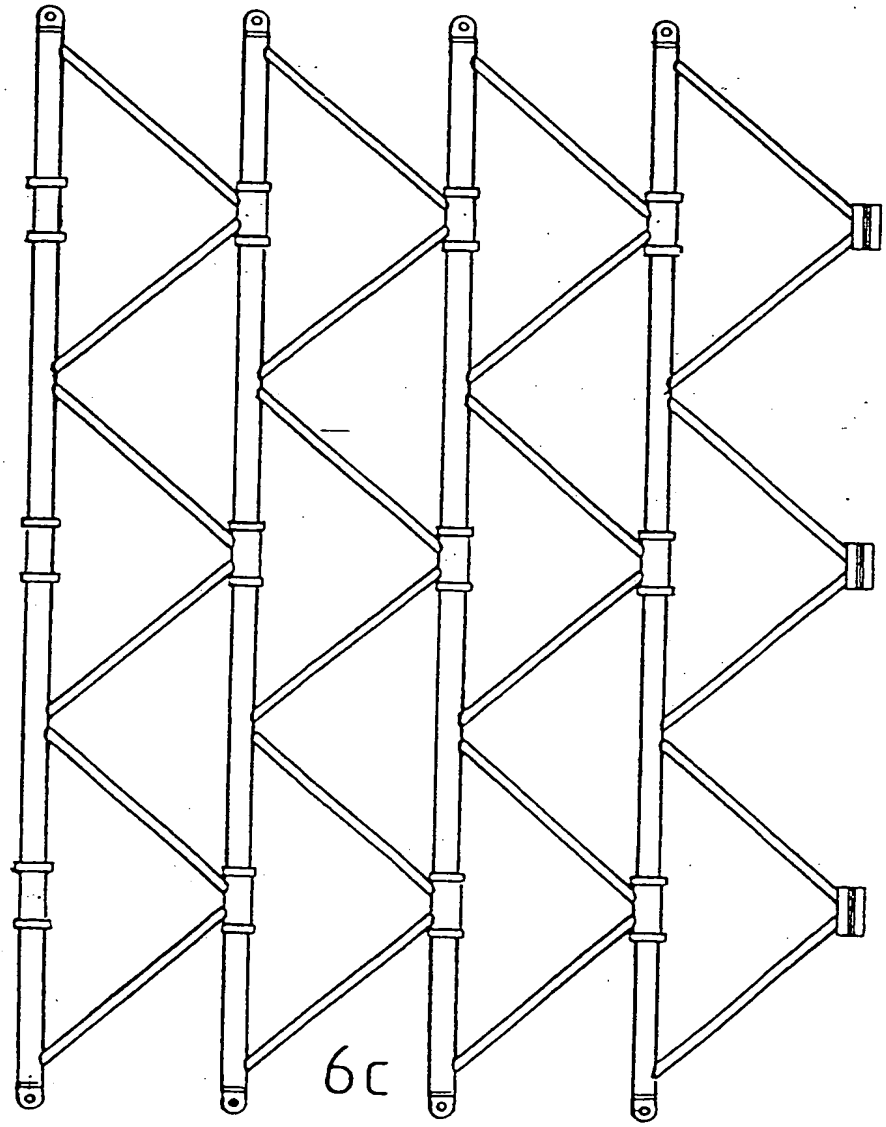
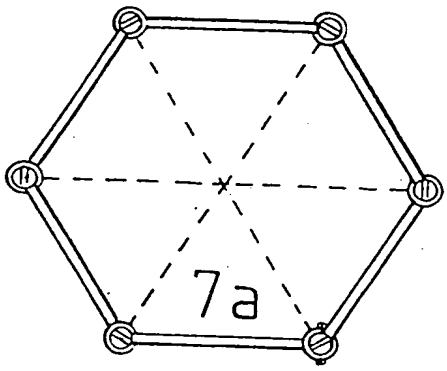
FIG. 6





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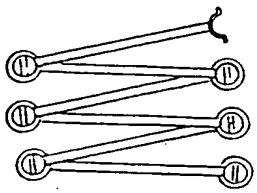

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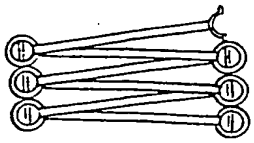

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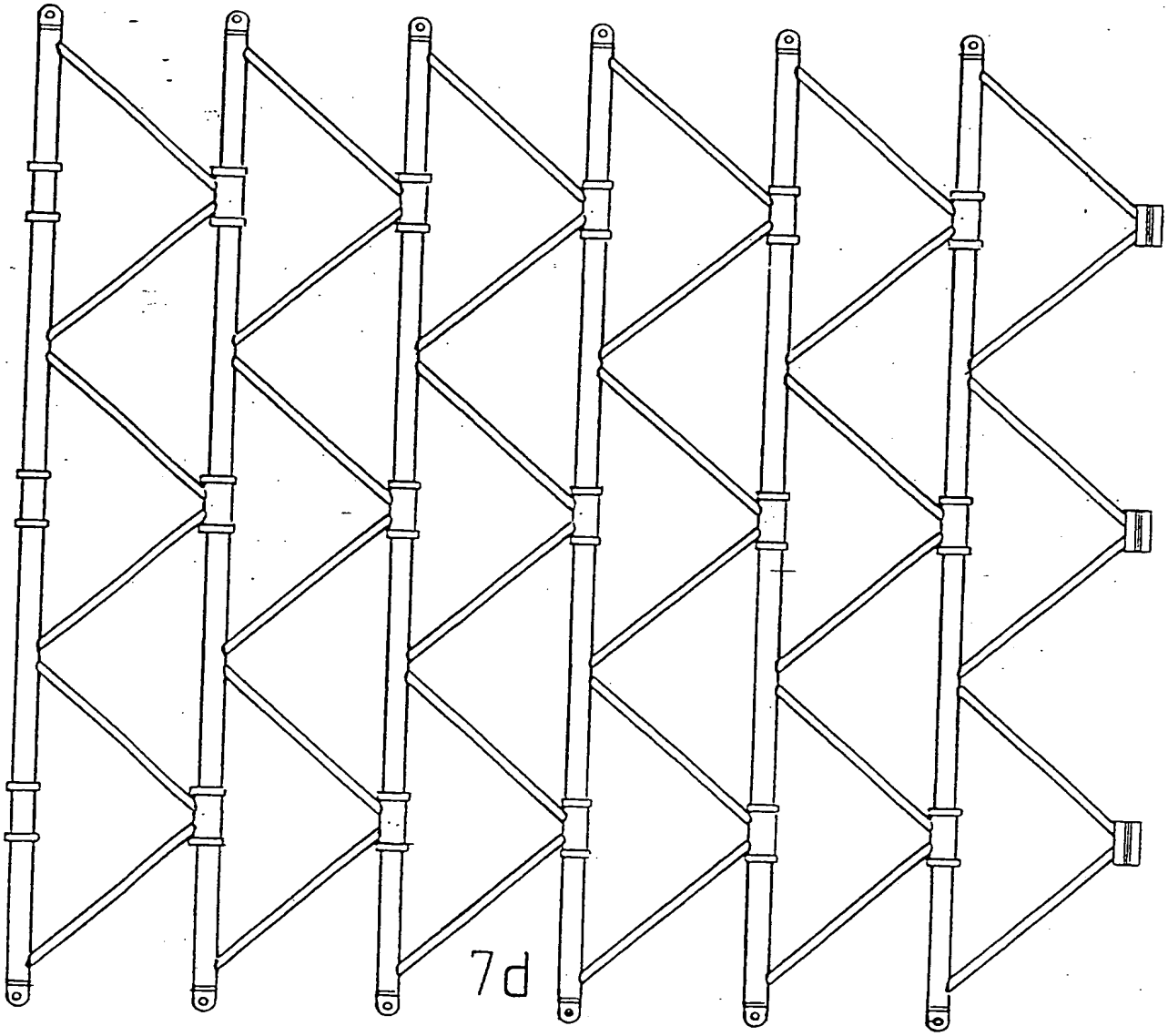

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FIG. 7

FIG. 8

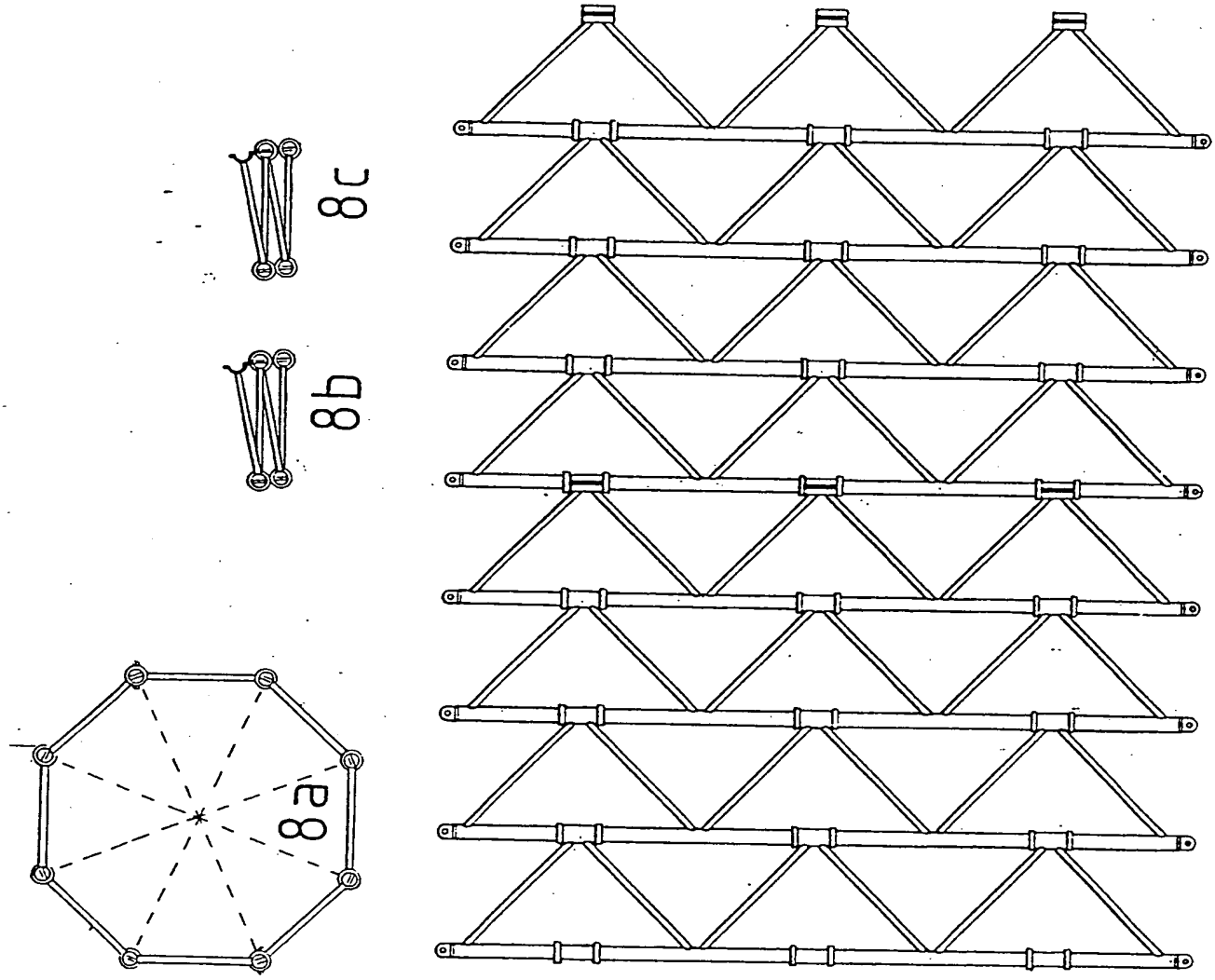
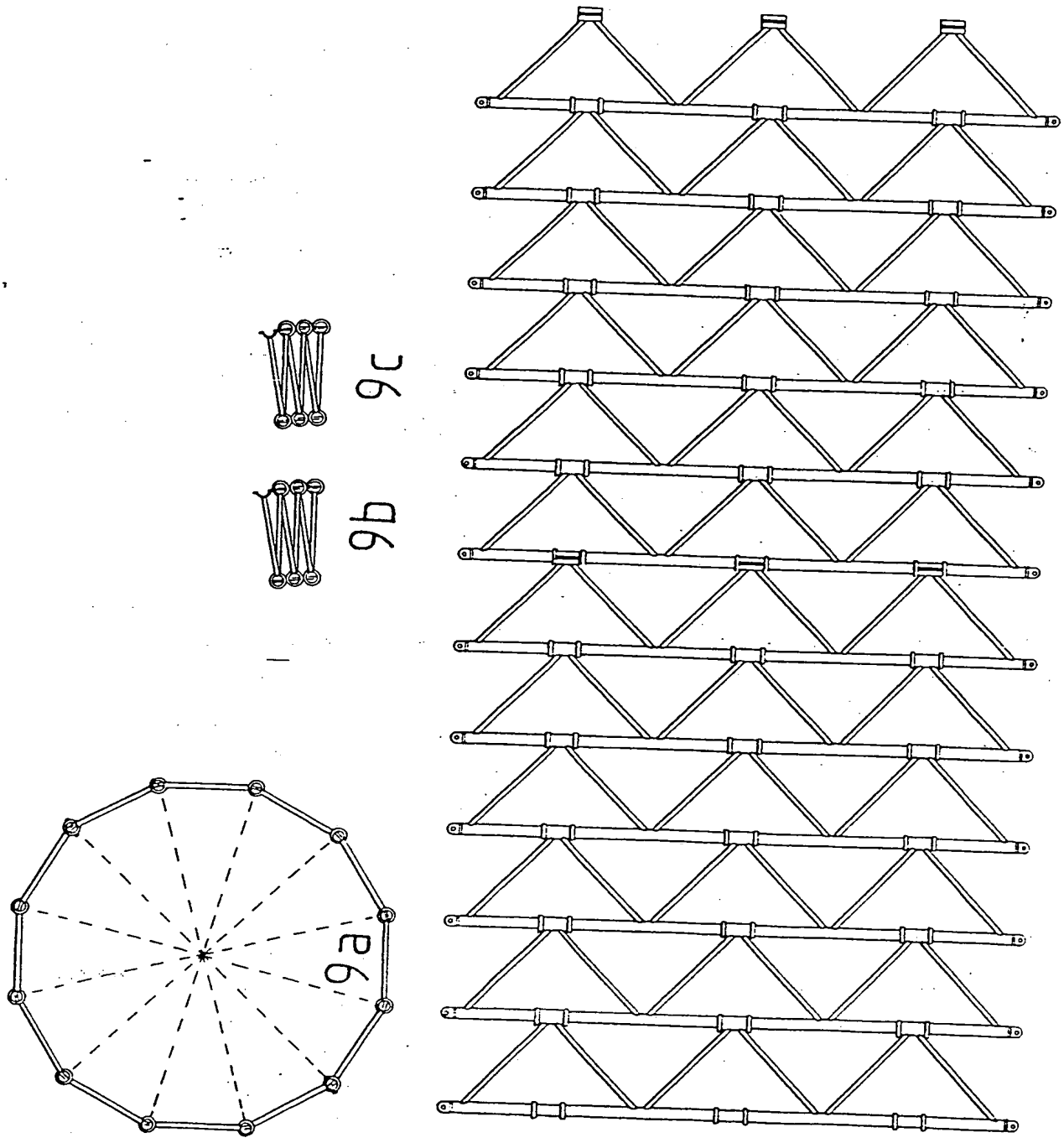
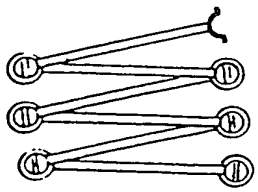


FIG. 9





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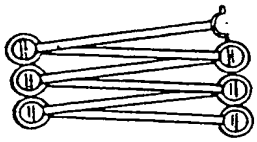

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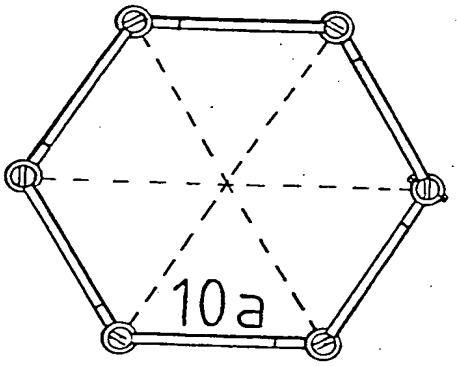

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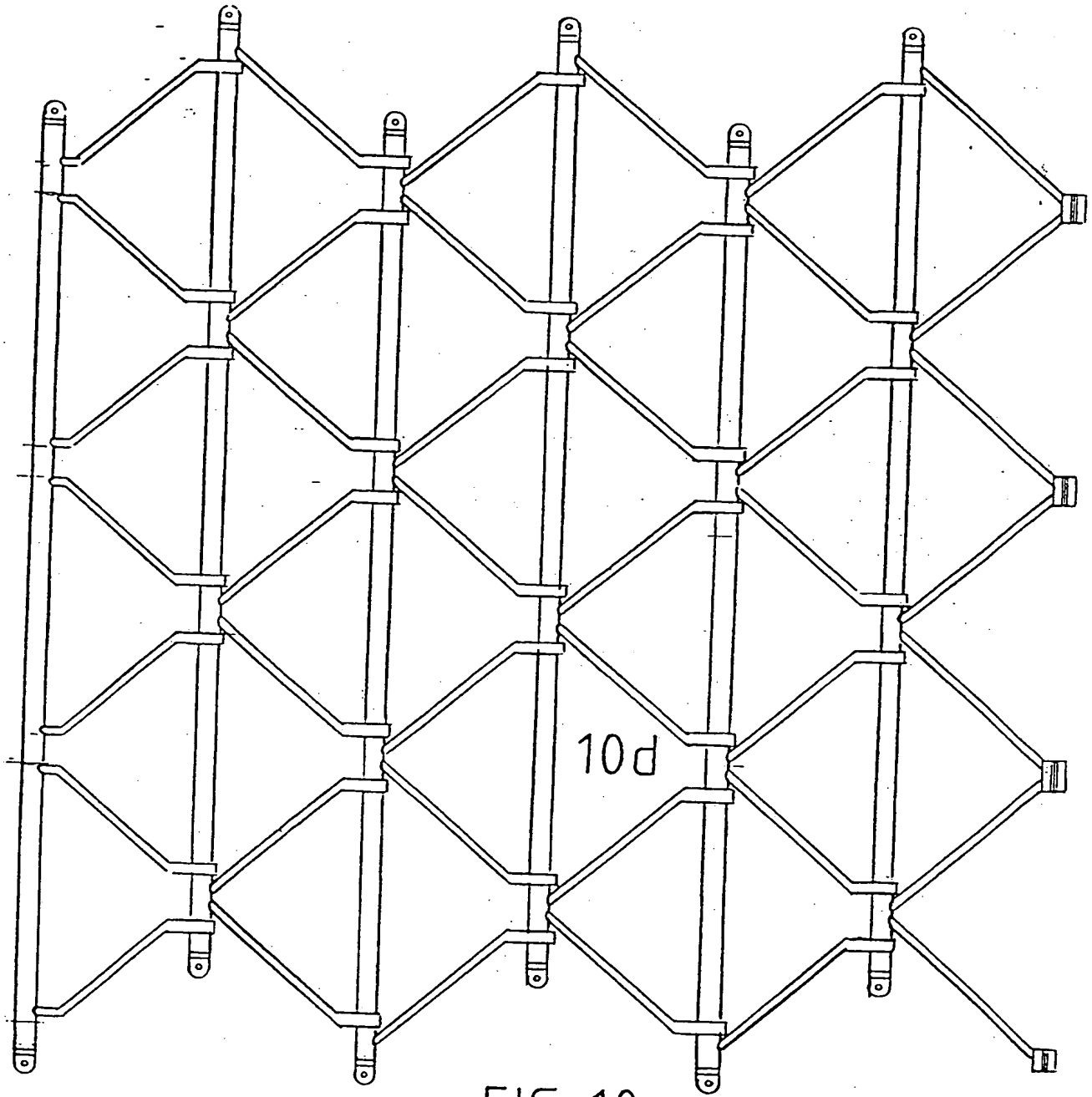

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FIG. 10

INTERNATIONAL SEARCH REPORT

Intern Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04C3/00 E04C3/08 E04H12/18 B66C23/68

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Minimum documentation searched (classification system followed by classification symbols)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 822 945 A (MULLER ROY) 20 October 1998 (1998-10-20) column 2, line 56 -column 3, line 50 column 4, line 19 -column 4, line 28 column 5, line 4 -column 5, line 33 column 6, line 10 -column 6, line 21 figures 1-5,7-9	1-4
X Y	FR 1 294 033 A (JAUREGUI) 19 October 1962 (1962-10-19) page 3, column 1, paragraph 7 -page 3, column 2, paragraph 1 page 3, column 2, paragraph 6 -page 4, column 1, paragraph 2 figures 6-9,11,13	1 2

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31 May 2000	08/06/2000

Name and mailing address of the ISA	Authorized officer
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PCT/NL 00/00158

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 93 20306 A (STRAND GUNNAR) 14 October 1993 (1993-10-14) page 11, line 1 -page 11, line 28 figures 7-9	2

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. Application No
PCT/NL 00/00158

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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FR 1294033 A	19-10-1962	NONE	
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